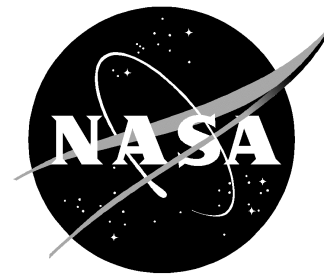


# NewsRelease

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## RESEARCHERS HUNT FOR TURBULENCE

### **NASA works to help pilots weather the skies**

Most planes fly out of their way to avoid atmospheric turbulence, but not a former airliner now outfitted as a NASA flying laboratory.

A NASA 757 research aircraft, based at NASA's Langley Research Center in Hampton, Va., went searching for thunderstorms over an eight-week period this spring. On board researchers with the NASA Aviation Safety Program (AvSP) were testing a new way to predict turbulence associated with those convective storms.

The 757 Airborne Research Integrated Experiments System (ARIES) is equipped with an experimental radar system designed to detect atmospheric turbulence by measuring the motions of the moisture in the air.

"NASA is working on an enhanced turbulence detection radar system, which is a software signal processing upgrade to existing predictive Doppler wind shear systems that are already on airplanes," said Jim Watson, deputy Turbulence Prediction and Warning Systems project manager. "There are very sophisticated algorithms that are designed to predict turbulence in front of the airplane and then relate those to safety measures that are dependent upon the aircraft itself. The complexity is great. It is a software/hardware intensive upgrade."

To see how well the enhanced radar performed, the 757 and its crew of two dozen researchers and technicians had to find the kind of bumpy weather most airline passengers find uncomfortable.

"Most people do try to avoid the weather we're trying to go to. We want to see the storm. We want to go near the storm -- within a safe distance," said Neil O'Connor, Langley aerospace researcher. "We want to experience the turbulence and compare what our radars predicted versus what we experienced."

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ARIES flew 13 research missions in search of convective turbulence. The jet would leave NASA Langley in Virginia and fly to areas where thunderstorms were predicted east of the Mississippi. NASA research pilots circled the thunderstorms repeatedly to subject the plane to rough air.

Inside the 757, researchers at test stations recorded conditions and also alerted the pilots when and where they were likely to encounter turbulence and how much. "The turbulence radar saw it coming where the standard plane's radar would not have seen it," said O'Connor.

Airliners are not currently equipped with turbulence detection systems. "Pilots predict turbulence ahead by experience and intuition, getting information from other airplanes that have encountered turbulence close by and extrapolating the existing weather radar system," Watson said. He added, "I think that we're looking at having some significant improvements coming on the aircraft within the next one to two years."

Atmospheric turbulence is the leading cause of in-flight injuries to airline passengers and flight crews. Federal Aviation Administration statistics show that 98 percent of those injuries happened because people were not wearing seat belts. An alert of impending rough air would give pilots time to warn passengers and flight attendants to buckle up and take steps to reduce turbulence effects. Turbulence is not only hazardous, it also costs the airlines money and time, in the form of re-routing and late arrivals.

To tackle turbulence, the NASA Aviation Safety Program (AvSP) is:

- Developing better forecasting techniques
- Drafting a turbulence characteristics scale
- Researching and testing detection technologies
- Studying methods to minimize turbulence effects

AvSP is a partnership with the FAA, aircraft manufacturers, airlines and the Department of Defense. This partnership supports a national goal to reduce the fatal aircraft accident rate by 80 percent in 10 years.

Researchers at four NASA field installations are working to develop advanced, affordable technologies to make flying safer: Langley; Ames Research Center at Moffett Field, Calif.; Dryden Flight Research Center in Edwards, Calif.; and Glenn Research Center in Cleveland, Ohio.

For more information on the NASA Aviation Safety Program please check the Internet at: <http://avsp.larc.nasa.gov>

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**Video of the flight tests is scheduled to be shown as part of the daily NASA Video File on June 18 and 19 at noon, 3 p.m., 6 p.m. and 9 p.m. Eastern. Changes in the Space Shuttle schedule may affect Video File airings. NASA Television is broadcast on GE-2, transponder 9C, C-Band, located at 85 degrees West longitude. The frequency is 3880.0 MHz. Polarization is vertical and audio is monaural at 6.8 MHz. Video and still photographs are also available on request.**